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Research, part of a Special Feature on [Social Learning in Water Resources Management](#)
**Spatial Misfit in Participatory River Basin Management: Effects on
Social Learning, a Comparative Analysis of German and French Case
Studies**

[Ilke Borowski](#)¹, [Jean-Pierre Le Bourhis](#)², [Claudia Pahl-Wostl](#)¹, and [Bernhard Barraqué](#)³

ABSTRACT. With the introduction of river basin management, as prescribed by the European Water Framework Directive (WFD), participatory structures are frequently introduced at the hydrological scale without fully adapting them to the decision-making structure. This results in parallel structures and spatial misfits within the institutional settings of river basin governance systems. By analyzing French and German case studies, we show how social learning (SL) is impeded by such misfits. We also demonstrate that river basin-scale institutions or actors that link parallel structures are essential for promoting river basins as management entities, and for encouraging SL between actors at the river basin scale. In the multi-scale, multi-level settings of river basin governance, it is difficult to fully exclude spatial misfits. Thus, it is important to take our insights into account in the current transition of water management from the administrative to the hydrological scale to get the greatest benefit from SL processes.

Key Words: *institutions; public participation; river basin management; social learning; spatial misfit; spatial scales; water management; WFD*

INTRODUCTION

According to the [European Water Framework Directive](#) (WFD) (European Commission (EC) 2000), water authorities are requested to involve “all interested parties” in the elaboration and implementation of new water policies (see Article 14 and the Preamble of the WFD). As part of the Common Implementation Strategy, the guidance document for public participation (PP) promotes a “learning approach” for authorities and stakeholders in the water sector (EC 2002).

The European project [HarmoniCOP](#) (Harmonising COllaborative Planning; 2002–2005;) has conceptualized this learning approach to river basin management planning (RBMP) using the notion of “social learning” (SL). According to the concept (Craps 2003, Pahl-Wostl et al. 2007), the extent to which SL is achieved is determined not only by the participatory process itself, but by its physical–ecological and governance context. In the ten HarmoniCOP case studies, integration across scales and policy domains was identified as one of the

major challenges to participatory processes (Mostert et al. 2007). Spatial misfit—e.g., differences in the scales of projects and the scales of stakeholders’ interests—was among the top ten barriers to SL (Searle et al. 2005).

River Basin Governance Systems and Spatial Fit of Institutions

The impact of institutions on actors’ roles and behaviors is a central issue in literature on institutions and natural resource management. In this context, institutions are formal (e.g., laws) and informal (e.g., social norms) rules and decision-making routines. The institutional settings, i.e., the interaction of institutions and their relations, are often discussed in terms of the interaction of administrative and ecological units (i.e., river basins in RBMP). Spatial misfit between a natural resource and resource management institutions occurs if the two do not refer to the same geographical area. It has been shown that such spatial misfits constrain sustainable management in river basins (Gibson et

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al. 2000, Young 2002, Dietz et al. 2003, Cumming et al. 2006, Folke et al. 2007). For example, upstream flood protection measures have often led to an increase of discharge to downstream areas, the impact of which is not considered (Pahl-Wostl 2006). Young's presumption is that "the closer the fit between ecosystem and institutional systems, the better the relevant institutions will perform, at least in terms of sustainability" (Young 2002:20).

With the introduction of the WFD, the (re-) introduction of the hydrological scale as the scale of management was intended to reduce this misfit. Instead, however, it has led to greater challenges with regard to collaboration (Moss 2003). For example, introducing institutions at the basin scale to eliminate spatial misfits within the water sector may lead to new misfits between institutions, e.g., with the agricultural sector or spatial planning departments. Although this paper does not directly discuss ecological issues, it highlights the challenges of improving the fit between ecological units (here: river basins) with single institutions in a complex multi-level, multi-scale governance context.

Developing the ideas of Mostert et al. (2007) and Pahl-Wostl et al. (2007), we compare the results of French and German case studies in order to help understand how spatial misfits between participatory and decision-making institutions impede social learning, and therefore, the success of RBMP. We assume the best fit is given if the institutions that support participation and that make the decisions are in the same authority and refer to the same spatial area (scale). This holds especially (and is even more difficult) for river basin management (RBM) at larger scales, as the diversity of administrative and geographical scales and bodies increases with the size of the area covered. Consequently, we explore whether one specific organization or authority at the river basin level is necessary to promote the river basin as an entity and to encourage SL among actors at that level.

By taking this approach, we do not question insights into institutions that claim that diversity in institutions (e.g., resulting from fragmentation and duplication of an authority) may also lead to higher resilience toward disturbances and may not necessarily decrease the efficiency of institutional settings (Folke et al. 2005:8.13). We also take the recursive nature of SL as given, including the potential of learning processes during the

development of institutions and their reciprocal adjustment (Tàbara 2005). However, our starting point is that, with the introduction of the WFD, participatory elements are often introduced in order to meet the requirements of Article 14 (WFD) without taking into account needs for SL in RBMP. Participatory structures, such as advisory boards or forums, were often introduced at hydrological scales without fully adapting the participatory to the existing decision-making structure. This resulted in parallel structures and spatial misfits within the institutional settings of river basin governance systems.

In the next section, we introduce our methodological approach to identify SL and the impact of spatial misfits. In subsequent sections, we apply this approach to analyze the results of the case studies. The paper concludes with a discussion of the impact of spatial misfit on SL and conclusions for the future design of SL processes in RBMP.

METHODOLOGICAL APPROACH

To study the impact of spatial misfit on SL, we describe spatial (mis)fits between different institutions and between different actors to characterize the institutional settings in French and German river basin governance systems. We identify spatial misfits between institutions by analyzing whether participatory institutions refer to the same jurisdictions as the decision-making institutions. Just as spatial misfit between institutions is identified, the spatial reference of actors (i.e., the spatial reference scale (SRS)) refers to the jurisdiction the organization assigns itself to. For example, the farmers' association "Kyffhäuserkreis" defines its jurisdiction as the spatial area of the county of Kyffhausen. An SRS defines the actor's most relevant problems (Lebel et al. 2005). In order to identify spatial misfits between organized actors, we compare the SRS's of governmental and other organized actors, based on the jurisdictions of their organization.

As a process- and context-based concept, SL can only be captured fully by exploring a wide range of aspects, such as those presented in the pool of questions developed as a guide to support the analysis of SL processes (Craps and Maurel 2003). Moreover, as under specific circumstances each single aspect could lead to the failure of an SL process, a number of barriers have been found in

other case studies (cf. Mostert et al. 2007, Pahl-Wostl et al. 2007). We have chosen five indicators within the scope of this paper: the availability of multi-party interaction, the nature and implementation of outcomes, the process boundary, the information flow, and the diversity of interaction. Whereas Fig. 1 highlights the position of indicators in the concept of SL, Table 1 gives a detailed overview of these indicators, including indications of support for and barriers to SL. In the following text, we specifically introduce these indicators in terms of their interaction with spatial misfits.

Availability of Multi-Party Interaction

Multi-party learning requires multi-party interaction (HarmoniCOP 2005; Craps and Maurel 2003; Wenger 1998). In RBMP, water authorities generally are the initiators of interactions with stakeholders. Often, following the tradition of dividing tasks according to areas and issues, this interaction only exists between the water authority and one stakeholder group at a time. If different issues or areas within a river basin are managed with only low (institutionalized) interdependency, interaction between the different stakeholders may be considered too much of an effort by the governmental actors even though ecological interdependency exists most times. Moreover, if stakeholders are organized with a different spatial reference, the governmental authority may not be inclined to initiate or participate in multi-party stakeholder interaction because it does not feel responsible for implementing the outcomes. If there is a lack of multi-party interaction, joint understanding between all stakeholders is less likely to be achieved. Therefore, SL will be hindered.

Nature and Implementation of Outcomes

A central aspect for stakeholders is the binding nature of decisions and other outcomes from the participatory process. As there are few resources available for participation, stakeholders need to be sure that the process will make a certain impact. At the same time, a strong binding nature for process outcomes may inhibit discussions and openness among stakeholders. For this reason, the process has to strike a balance between its openness of outcomes and the expected gains and incentives for participants to engage in participatory processes as

a prerequisite to SL (e.g., Woodhill 2002, Snyder et al. 2003). Exploring the nature and implementation of the outcomes of a process helps us to identify whether SL had a direct effect on RBM activities.

If participants have different SRSs, then outcomes may be translated differently to different scales. This could cause confusion and deficits in the commitment of stakeholders to support the implementation of the outcome.

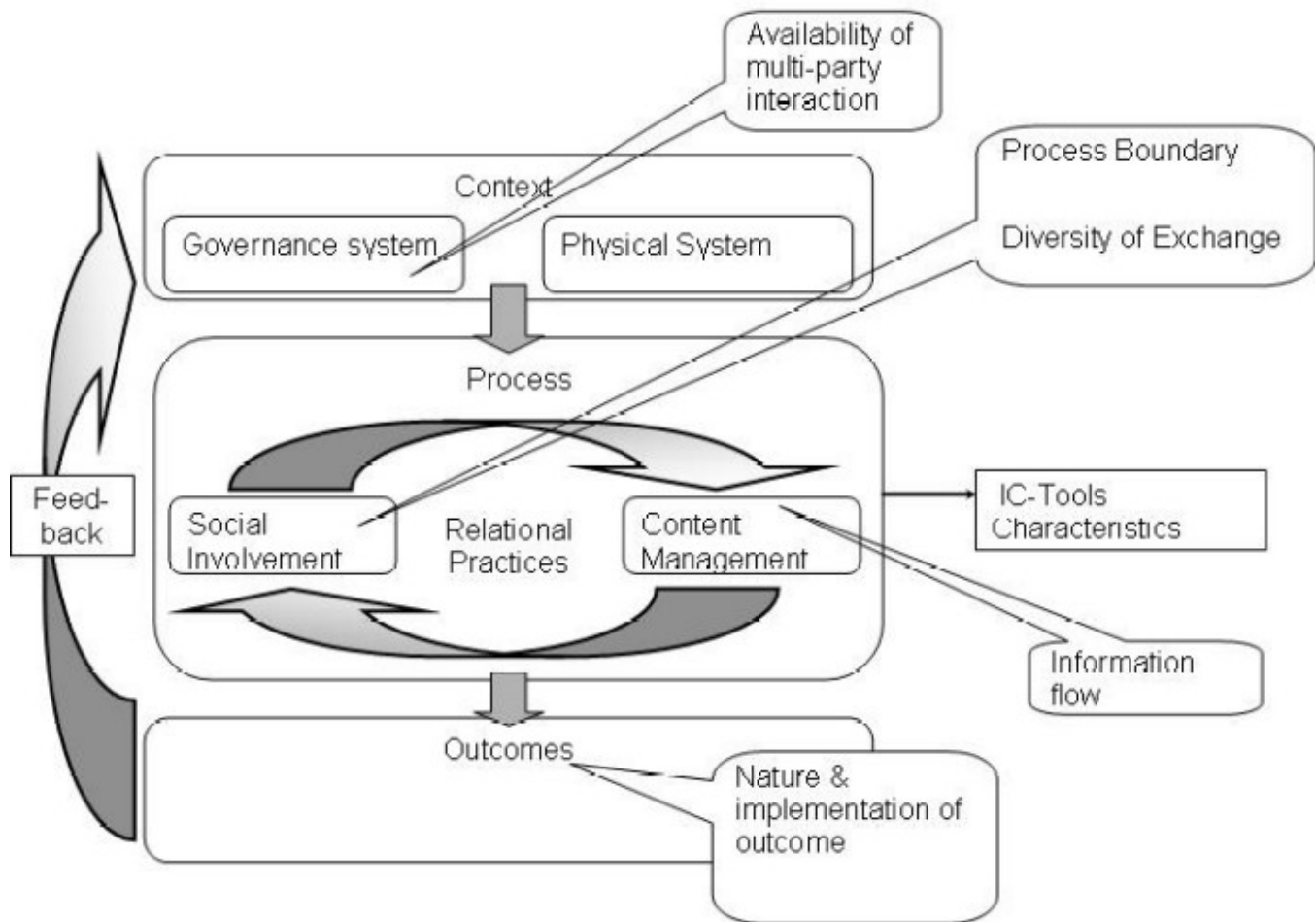
Process Boundary

In order for SL to take place, processes need strong boundaries that help participants identify the process as being unique and necessary to provide a protected space where participants can open up and truly learn. The processes need an atmosphere in which understanding is promoted, where “silly questions” can be asked and successes of previous actions can be reflected upon (Wenger 1998, Craps 2003). Creating a process boundary is not only a matter of design (e.g., giving a specific, unique task to a group). It also depends on the relevance and importance that participants attach to the process. In the case of spatial misfits between participatory and decision-making processes, this can lead to both processes having unclear roles, thus weakening their strength, as perceived by participants. Moreover, spatial misfit between different participants increases the risk of alternative platforms being found that enable certain stakeholders to advocate their interests more effectively than others.

Information Flow

Complex issues such as RBMP involve dealing with a significant amount of information. “Information flow” refers not only to the direction of the information flow but also to whether stakeholders feel confident with it. Social learning requires that information is not only imparted by one actor to others, but that it is also exchanged and discussed among all actors. If stakeholders (e.g., at the regional scale) do not focus mainly on water issues, they may find it difficult to identify the relevance of the information, especially if it relates to a different scale (e.g., European). Information overflow easily occurs, leading to participants harboring mistrust and a lack of confidence.

Fig. 1. Social learning (SL) concept (simplified) according to Craps (2003), and indicators (balloons) applied in this paper. The process of SL is embedded in the physical–ecological and the governance contexts. In the process, relational practices defined by social involvement are as important as content management. The outcomes of a process feed back to its context. See also Pahl-Wostl et al. (2007) and Mostert et al. (2007).



Diversity of Interaction

Social learning needs different kinds of interaction, e.g., not only presentations and answers to questions, but room for discussion, without focusing solely on output (Wenger 1998). In addition, informal interactions, e.g., during coffee breaks, are paramount to the success of SL. Spatial misfits at the international level, for example, could lead to a language barrier between actors, limiting informal

interaction. If diverse types of interaction are possible, they may lead to a relaxed perception of existing hierarchies that are often linked to different scales.

In the following two sections, analysis is carried out separately for each case study.

Table 1.. Overview of indicators for SL applied during the analysis of German and French case studies. SL: Social Learning. SH: stakeholder; RBMP: river basin management planning; GO: government organization; NGO: non-governmental organization.

Aspect of SL	What to check	SL is supported by...	SL is hindered by...
1) Governance Context of SL (indicator: availability of multi-party interaction among all actors)	<ul style="list-style-type: none"> - existence of institutions for multi-party interactions 	<ul style="list-style-type: none"> - e.g., multi-SH forums (such as advisory boards, panels or pilot projects) that allow collaboration in different forms 	<ul style="list-style-type: none"> - no opportunity for interaction between interested parties.
2) Outcome (indicator: character of outcome and implementation of outcome)	<ul style="list-style-type: none"> - formalized status of outcome - actual uptake of SHs' input and their confidence in it - attitude of all actors: how do they consider the status of the outcome? 	<ul style="list-style-type: none"> - jointly developed outcome that is considered by the responsible authorities 	<ul style="list-style-type: none"> - unclear status of outcome (binding/non-binding) - very strong binding nature of outcome constrains the openness of discussion process
3) Social involvement—boundary management (indicator: process boundary)	<ul style="list-style-type: none"> - actors' position on role of process for their work - existence of alternative processes - continuity of participation in process - involved actors' support of the process 	<ul style="list-style-type: none"> - identification of process as unique and necessary for RBMP in respective basins - actors perceive that all relevant parties participate in the process 	<ul style="list-style-type: none"> - open process with changing participants - alternative and independent process (e.g., regional planning) with more importance for SHs - Other actors identify SHs who should but do not participate
4) Content management (indicator: information flow)	<ul style="list-style-type: none"> - confidence of SH in information flow - direction of information flow: who provides the information? 	<ul style="list-style-type: none"> - sufficient information flow on aims and objectives of process, including nature of outcome - information flow between all actors, not only from GO to NGO 	<ul style="list-style-type: none"> - lack of information on role of SH participation - information overflow
5) Social involvement—ground rules (indicator: diversity of interaction)	<ul style="list-style-type: none"> - availability of different forms of encounter (meetings, excursions, project working groups) - forms of interaction: possibility for informal meetings (coffee breaks, dinners, excursions), e.g., presentations or room for open discussion during meetings 	<ul style="list-style-type: none"> - different forms of interaction, e.g., roundtable meetings, informal dinners, excursions... - Space for discussion in addition to provision of information; questions requiring clarification are answered; stereotypes/prejudices are openly discussed; 	<ul style="list-style-type: none"> - lack of diversity of exchange, e.g., only meetings for one-way information flow

RESULTS FROM THE ELBE RIVER BASIN: DIVERSITY IN SPATIAL MISFIT IS FOLLOWED BY DIVERSITY OF SUCCESS IN SOCIAL LEARNING

The German case study (Borowski et al. 2004) examines SL at the international basin level, as well as the regional sub-basin level in the international Elbe river basin (150 000 km²). It focuses on the first few years after the introduction of the WFD (2003–004). At the international level, the German delegation of the working group for the implementation of the WFD (WG WFD) (embedded in the structure of the *International Commission for the Protection of the Elbe river* (ICPE)) initiated a discussion to decide whether PP at the international level would be beneficial to the successful implementation of the WFD. In the course of this discussion process, the WG WFD decided to invite randomly chosen stakeholders as observers, rather than choosing them based on an in-depth stakeholder analysis. Of all of the stakeholders, only the German environmental NGOs sent observers to different working groups, even though it was long after the deadline.

At the regional level, Thuringia, which covers about 4500 km² of the Elbe basin, was chosen for this case study as it pursued one of the most advanced PP strategies in Germany. The Thuringia Ministry of Environment introduced participatory institutions at the federal state level (one advisory board) and at the sub-regional level (three forums) to involve organized stakeholders so that they could agree with and support implementation of the WFD. Recognizing the need for practice in collaboration, stakeholders were also invited to suggest pilot projects where typical measures of the WFD would be implemented through collaboration between at least three stakeholders. We studied the process during the course of the first three meetings of one of these forums (the Unstrut-Leine Forum (ULF)), where stakeholders were informed about the WFD and various other activities. The stakeholders also had to rank the proposals made in the pilot projects.

Further information on the methodological approach for obtaining the qualitative data through interviews, literature analysis, and observation can be found in App. 1.

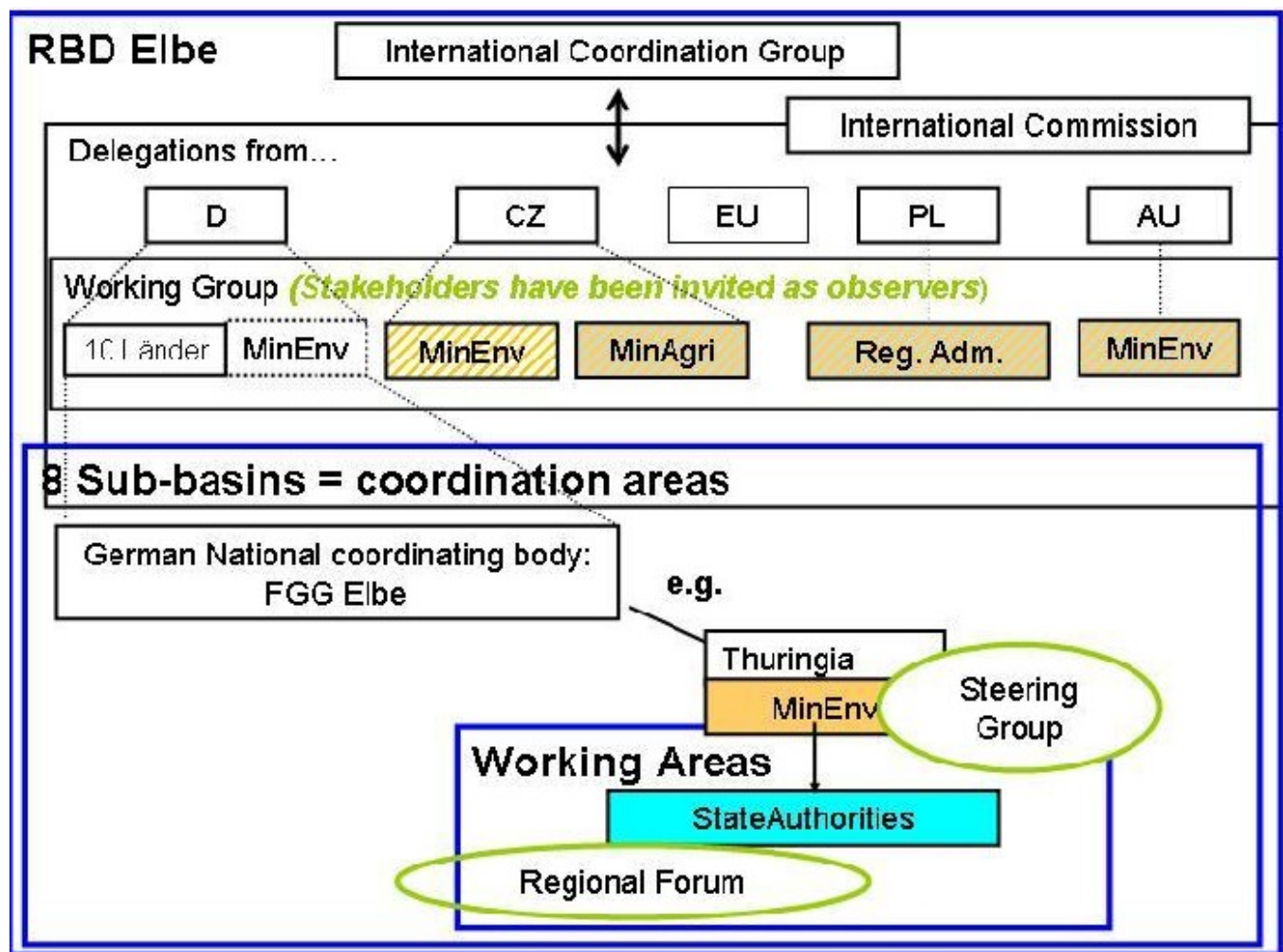
Characterization of Institutional Settings in Terms of Spatial Misfit in the Elbe River Basin

As far as RBM and spatial misfit were concerned, the situation in the Elbe river basin was characterized by an attempt to retain the traditional and well-tried structures of the administration, while at the same time complying with the new challenges introduced by the WFD. The resulting parallel structures of hydrological and administrative units led to a diversity of scales of action (see Fig. 2).

At the international level, the institutional setting brought four national states together, i.e., four complementary (in terms of area covered) and sovereign institutional settings. Almost two-thirds of the Elbe River Basin are in Germany, touching minor or major parts of ten federal states (*Bundesländer*), one of which is Thuringia. About one-third of the river basin is in the Czech Republic. Minor areas of the basin (>0.5%) are situated in Poland and Austria. At the international level, the organization responsible for the coordination of RBM is the ICPE. In the ICPE, technically, different working groups prepare the decisions to be taken at the national government level, i.e., environmental ministries. However, legal responsibility for implementation of the WFD as a European directive remains with the Member States. In Germany, this responsibility has been assigned to the federal states. In Thuringia, e.g., the Ministry of Environment has become the responsible authority and, in turn, has delegated the operational task of its implementation to the district level. A more detailed description of the institutional settings can be found in App. 2.

The actors participating in the WG WFD were members of the ICPE secretariat and delegations of the different Member States (Germany, the Czech Republic, Poland, and Austria). With the exception of ICPE representatives, members referred to different spatial areas that covered all parts of the Elbe river basin. Whereas the Czech delegation consisted of representatives of the nationally responsible ministries, the German delegation included representatives from the riparian German federal states. The German national environmental ministry chaired the working group. To conclude, at the international level, the institutional setting can be characterized as spatially complementary, strong, and comprising relatively independent institutions. No stakeholder group covered the whole area of the Elbe river basin. Most groups did not even maintain close interaction with groups

Fig. 2. Institutional settings in the Elbe river basin according to Borowski et al. (2004). RBD = River Basin District Level; D = Germany; CZ = Czech Republic; PL = Poland; EU = European Commission; AU = Austria; MinEnv = Ministry of Environment; MinAgri = Ministry of Agriculture (both national in Working Group box and federal in Thuringia); Reg. Adm. = regional water administration; FGG Elbe = Flussgebietsgemeinschaft Elbe (Elbe River basin community). The darker the shading in the boxes, the more responsibility the relevant authority has. A more detailed description of the institutional settings can be found in Appendix 2.



from the other regions. Only the environmental NGOs comprised many organizations, which had built up a network and followed a mailing-list-based approach to develop joint positions.

In Thuringia, the participatory institutions were explicitly established along the same areas as the administrative units. The advisory board was

established at the level of the federal state of Thuringia. Three stakeholder forums were introduced at the district level. At the same time, the Ministry tried to use hydrological borders as a guide by reflecting the basins' names in the names of the stakeholder forums. For example, the Unstrut-Leine Forum (ULF), which we explored, contains two sub-basins from two different river basin districts.

Nonetheless, some actors in the ULF covered different areas. Whereas some bodies, e.g., the farmers' organization, sent local representatives, other actors, such as the water company, were active throughout Thuringia and sent the same representative to all of the forums. In summary, the institutional settings in Thuringia can be characterized as spatially well-adjusted institutions. Spatial misfit only occurred in terms of the (partly competing) actors' different spatial references. The area and different actors referred to sometimes overlapped in partly hierarchical nested systems or complemented one another. Compared with the other processes explored in this paper, the process in Thuringia was designed to be spatially "closed," i.e., the Ministry of Environment tried to minimize "disturbance" from the rest of the Elbe river basin (at the national or international scale).

Indications of SL in the Elbe River Basin

Availability of multi-party interaction

At the international level, there was no multi-party interaction between the water authorities and other stakeholders. The main multi-party interaction throughout the case study at the international level of the Elbe river basin took place during the WG WFD meetings. At the beginning, no stakeholders participated in discussions. Bilateral interaction took place at the national level between water authorities and single stakeholder groups.

At the regional level, in the ULF, multi-party interaction was one of the main objectives. This means that in terms of multi-party interaction, a formalized institution was established. In addition, the competent water authority raised European funds to set up pilot measures in the basins in order to gain experience in collaborative planning. In Thuringia, the conditions for SL were very good in terms of multi-party interaction.

Nature and implementation of outcomes

The decisions taken at the international level were only recommendations. Adoption of these recommendations by the conference of the various ministries took a more formal nature. Often, recommendations of the WG WFD were fed back as (new) tasks to ICPE working groups. The nature of the outcomes, once approved by the conference of ministries, was binding. In the course of

discussions within the WG WFD, this lack of formal decision-making power was taken by WG members as an argument for not involving stakeholders beyond informing and consulting them within the written obligations of Art.14 (WFD), because the provision of stakeholders' recommendations could not be guaranteed. Looking at the general adoption of these recommendations, however, it can be seen that this was more of an excuse to avoid discussion with stakeholders. This is confirmed by stakeholders who report a lack of information on the nature and impact of international processes. The nature and implementation of the process outcomes at the international level did not support SL.

In Thuringia, participatory institutions were also only able to give recommendations to the Thuringia Ministry of Environment as the authority responsible for implementing the WFD. Some stakeholders stressed the importance of these recommendations being considered because they were not interested in wasting their time and resources on irrelevant processes. Realizing this, the Ministry of Environment in Thuringia tried to balance as transparently as possible the interest of stakeholders with their own interest as the responsible authority. For example, after initial discussions on the pilot projects, the Ministry announced that the forums' foremost priorities for the pilot study had been taken into account, but the decision on the remaining projects also had to cover specific issues of importance for the Ministry. Although at first sight, the binding nature of the process outcomes was as weak as that at international level, the transparent approach by the water authority in implementing the outcomes can be considered as providing good conditions for SL.

Process boundary

Although the activities of the WG WFD were considered unique and necessary in the Elbe river basin by the interviewees, the process boundary was not deemed strong *at the international level* because international coordination was identified as an important means to facilitate *national river basin management* instead of impacting the international level. Most respondents deemed the national (and, in Germany, federal) level responsible for implementation. For example, German WG WFD representatives from the national Ministry of Environment also viewed the process as a means to homogenize the different positions of German

federal states. Stakeholders perceived the process of the WG WFD to be closed. If stakeholders considered implementation of the WFD to be relevant at all, they had different methods to maintain their interest. In terms of SL, this also shows that the process boundaries were not identical for all actors.

In Thuringia, participants considered the activities of the ULF very important to ensure fair implementation of the WFD. However, those stakeholders (municipalities, farmers) who focused more on only local or federal state scales expressed their concern that their interests could be ignored at a higher scale. They stressed that they would also be prepared to leave the new institution (forum) to make renewed use of traditional networks.

The process boundary around the Thuringia processes had the potential to be quite strong. However, some stakeholders doubted whether it would succeed there.

Information flow

Information flow took place between the different governmental actors, but not from the NGO to the governmental actors at the international level. The NGO observers were not involved in discussions. Information flow in meetings was characterized by reports from national delegations. Stakeholders felt that they were not sufficiently informed by the ICPE, and felt that the water authorities deliberately kept information from them.

In the first few meetings of the ULF in Thuringia, information flow from the water authorities to other actors dominated. Nonetheless, the actors considered this provision of information to be very important, and they regarded themselves as well informed.

Diversity of interaction

At the international level, discussion was possible although very limited during the course of WG WFD meetings. Dinners and excursions were sometimes scheduled to provide a number of opportunities for exchange; however, most of the German delegates were unable to speak Czech, and there was great reluctance to chat on both sides.

In Thuringia, the dominance of information provision did not allow for much discussion. The

first discussions started during the process for ranking the pilot projects. Further discussion on the actual program of measures was also expected later on in the process.

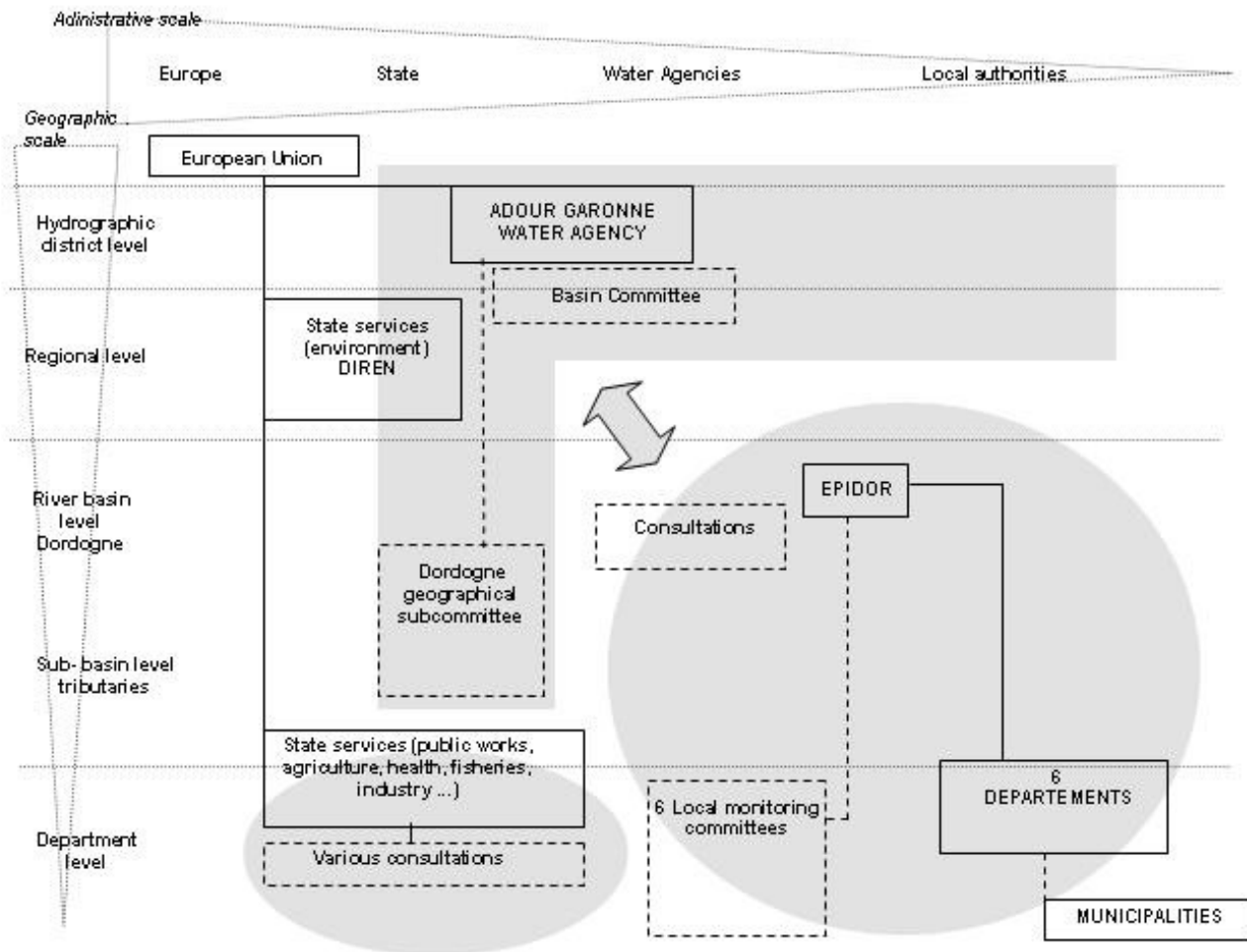
RESULTS FROM THE FRENCH DORDOGNE RIVER BASIN: ESTABLISHING A LEAD ACTOR TO LINK SCALES

The French case study analyzes SL at the basin and sub-basin level. It focuses on the Dordogne river basin (24 000 km²), in southwest France. The basin crosses six départements (counties) and four regions. The processes selected for the study go back to the mid 1980s and illustrate the development of a RBM structure linked to a participatory approach. Discussions held at the end of the 1980s led to the launch of a PP process in 1991 by a coalition of the main local authorities (“départements”) of the Dordogne Basin. Its aim was to raise public awareness of river problems. We studied this “Dordogne Valley Summit Process” (DVSP), which involved all activities and stakeholders related to the river basin. A public body “EPIDOR” (Dordogne Interdepartmental Public Body, see App. 3 for further details) was founded from the very start to lead the process and to coordinate between public and private actors in the Dordogne river basin (through expertise and advice, planning, and PP). In March 1992, a “Dordogne Valley summit” took place, leading to the adoption of a river basin Charter.

Figure 3 gives an overview of the participatory efforts in the Dordogne river basin and its organizational structure (the “EPIDOR process”). It also describes the parallel activities of the Water Agency in RBM and PP (since 1994; “SDAGE process”). For a more detailed description of the institutional settings, please refer to App. 3.

After the 1992 Summit, EPIDOR took a leading role as a technical actor and/or mediator in a series of follow-up processes, focusing on different sub-basins or issues in the Dordogne basin. In the context of this paper, we also explore one of these processes: the management of water levels, as it offers a good example of multi-scale intervention. The water level management process was a participatory approach set up by EPIDOR in 1999. It was still in existence in 2004. Its aim was to find a solution to the conflict between the hydropower company (releasing water

Fig. 3. Organizations intervening in participatory RBM in the Dordogne Basin. The gray areas in the L-shape and O-shape represent the participatory efforts of the Water Agency and EPIDOR, respectively. Although some tensions remain between the two institutions (due to their competing claims to define water policy on the Dordogne), they collaborate regularly in the elaboration of measures and policies (Barraqué et al. 2004). The implementation structure, however, remains under the control of the State (bottom-left corner).



from its reservoirs), and fishermen and environmentalists who were endeavoring to protect the ecosystem. The issue addressed the main stream of the Dordogne River (450 km), however, not in terms of the whole basin area but limited to the local riparian actors. The process aimed to provide a forum for all opponents to enable them to negotiate

the management of reservoirs and water levels together. During this long-term process, considerable efforts were exerted to build a common knowledge base by, e.g., inviting external experts. Nonetheless, the process suffered from a turnaround of participants. Initially, this was positive because local fishermen, who had dropped a lawsuit against

the power company, joined the process. A few years later, the process ground to a halt after an agreement on specific management options was reached, although the thorny issues of finances were not negotiated. This was delegated to a government-only platform.

Further information on the generation of the qualitative data in the case study can be found in App. 4. A full report on the French case study can be found in Barraqué et al. 2004.

Characterization of Institutional Settings in Terms of Spatial Misfit in the Dordogne River Basin

As with the Elbe river basin, at the Dordogne river basin level there were overlapping areas for different water authorities and nested scales where regions, departments, and municipalities interacted. EPIDOR emerged as a coordinating and neutral body at the river basin level. Spatial misfit occurred with the river basin because only the coordinating actor EPIDOR referred to the river basin as such. Spatial misfit also occurred between participatory institutions (referring to hydrological areas) and the administrative decision-making structure, and between the actors, because their spatial references complemented and overlapped one another. Moreover, with the exception of EPIDOR, no other stakeholders referred to the river basin as an entity.

Participatory institutions, such as the Dordogne Valley Summit and the water level management process, were set up according to issues and hydrological areas. However, instead of being linked to existing administrative structures, they were often set up parallel to the decision-making structure. This misfit was supposed to be rectified by establishing EPIDOR as a coordinating body. During the development of the River Basin Charter, EPIDOR went to a lot of trouble to raise awareness for the river basin as an entity and to support stakeholders' interests at this scale.

During the process of managing water levels, the actors involved had different spatial references. Whereas fishermen were locally settled, the hydropower company was a (inter)national player. The working group had a spatial reference, which was defined by the problem, i.e., the river itself, due to the impact of sudden changes in the level or water temperature. In this example, spatial misfit can be

identified in the different SRS of the actors and the problem area.

To summarize, the Dordogne institutions can be characterized as being spatially complementary, strong, and relatively independent. The stakeholders, who sometimes competed with one another, referred to overlapping territories, often in hierarchical nested systems (e.g., *département*/municipalities).

Indications of SL in the Dordogne River Basin Case Study

Availability of multi-party interaction

Although there was only one large meeting during the Dordogne Valley Summit process that allowed different stakeholders to interact directly, the preparatory phase also involved different stakeholders and other negotiation processes (on issues, problems, solutions, etc.). Multi-party interaction was at least available for all stakeholders at once. However, it was strongly supported by bilateral interaction between EPIDOR and the different stakeholder groups.

During the process of managing water levels, the working group enabled multi-party interaction. However, at some point, it became clear that one important party (which had decision-making power over the issue) was not involved. This led to the premature end of the process (see also process boundary).

Nature and implementation of outcome

The results of the summit—370 unanimous agreements out of 402 detailed issues, after 3 days of debates—were often general and provided recommendations for RBM. Local monitoring committees (see Fig. 3) were set up to control their implementation, which was still very limited. In particular, the responsible water authorities (State Services in Agriculture and Industry) did not support the results of the process, i.e., they did not use them to develop other management plans or to take specific decisions (e.g., to authorize water abstraction for irrigation).

For water-level management, the outcomes were expected to be implemented by the participants. However, implementation of the agreements was

disappointing in some cases, causing some actors, such as environmentalists, to question the usefulness of such negotiation processes compared with legal action. Also, because the proposed management options did not solve the issue of distributing the resulting costs, this weakened the relevance of earlier agreements.

Process boundary

For the Dordogne Summit process, the spatial boundary was the river basin of the Dordogne River. Due to the high diversity of the actors' SRS, the hydrological frame proposed by EPIDOR for the Dordogne Charter dominated the process; it managed to subsume the diversity of regional interest in more general agreements and vision. At this time, the process was truly innovative in France and, therefore, had a high profile in the media and with the public. The boundary of the process was initially defined by the temporal aspect, culminating in the summit. This was a clear indication of the uniqueness of the process and the lack of similar alternative processes. This strength of process was also confirmed by participation in the Dordogne Summit process, which was very broad. No actor was overlooked; EPIDOR supported some of the stakeholders with funding and expertise to enable them to integrate their vision in the document. The stakeholder groups in the river basin assigned 57 negotiators who participated at the Dordogne Summit in 1992. All of these representatives referred to specific interests (from agriculture to tourism) that were not directly linked to river basin issues (except for environmentalists and some fishermen). At the summit, the distribution of roles between institutions was symbolized by seating the negotiators at a round table and placing the elected officials (the six County presidents plus one prefect) on a higher setting but in the back of the room—a strong sign that they supported the charter process without getting directly involved. This can be considered a weakness in the process boundary.

During the initial steps of the management process on water levels (1999), the list of actors only included public authorities (state services at different levels, local elected representatives) and the regional branch of the national hydropower company (Electricité de France (EDF)). The first working group, however, was soon extended to include fishermen and environmentalists, after they dropped a lawsuit against the company. It emerged that the agreements reached by the participants were

also dependent on decisions made at national level, because they required financial support from the government and a change in the national power strategy of EDF. This led to consultation with the ministries (of industry and ecology) and creation of a new negotiation forum with only governmental representatives. To summarize, the process boundary was initially very strong, but was then perforated by an increasing awareness of the role of the (non-participating) national level. The process boundary had to be expanded to include actors at the national level, which was only achieved by excluding other participants from the process.

Information flow

The summit was laboriously prepared, with a rich information flow between stakeholders and EPIDOR. The latter organized, synthesized, and disseminated different stakeholders' positions, providing an equal information basis for all actors.

For water level negotiation, information flow was deemed positive for SL, in particular for improving relations between the hydropower company and local fishermen. External expertise was also acquired through scientific studies and shared among participants. Disappointment concerning implementation of the outcomes also indicated a lack of information flow with regard to the nature and limitations of the negotiation outcomes.

Diversity of Interaction

At the summit, debates were organized and rationalized by a number of rules, e.g., no more than 3 minutes per participant; a veto right for each actor against unacceptable propositions. Because the issues and problems had previously been discussed and established during the preparatory phase, there was no room for questions. Only management options and concrete decisions were discussed and, in the case of unanimity, voted upon. This limited the diversity of interaction to bilateral interaction between the different stakeholder groups and EPIDOR, and a strongly formalized one-off interaction between all stakeholder groups.

For water level negotiations, the diversity of interaction was deemed positive for SL, in particular for improving relations between the hydropower company and local fishermen.

DISCUSSION: COMPARISON OF GERMAN AND FRENCH CASE STUDY RESULTS—HOW TO DEAL WITH SPATIAL MISFIT?

The analysis has given four examples of how spatial misfit between institutions regarding participation and decision making can be addressed. Table 2 compares the main results from the two basins, which are discussed below in more detail.

All the processes explored took place in well-established, multi-level governance systems with complementary, partially overlapping, or nested institutions. The results show that, as the size of the area addressed increased, so too did the difficulties experienced in setting up any sort of multi-party interaction increase. The causes for this may be the unclear potential role of such interaction, difficulties in identifying and motivating the relevant actors in the increasingly complex system, or simply the sheer number of actors. Similarly, the impact of such interaction in terms of the nature and implementation of its outcome also became weaker with increasing size of the area. It seems almost banal that SL processes are more difficult (but not impossible) to set up and implement successfully with increasing area size and numbers of actors. Not only is SL dependent on the size of geographical and administrative scales, but also on how the existing institutions fit within them. This is why it is interesting to explore the weaknesses of the different approaches chosen.

At the river basin level, both the Dordogne and the Elbe river basin governance systems had to deal with spatially complementary institutions that were strong and relatively independent of one another. In both cases, acknowledging the need for coordination, one coordinating body existed to support the water authorities, even before the introduction of the WFD. However, these bodies were rather different.

In the German case, the ICPE secretary was mainly responsible for providing logistical support to implement the agreements issuing from the ICPE, i.e., coordination between different ICPE members. Interestingly, the water authorities attempted to play down the impact of the WG WFD instead of underlining the importance of international processes. This probably also contributed to stakeholders' reluctance to become involved. It probably weakened the process, as did the

dominance of intra-national issues. Information flow and interaction took place in a rather formalized setting, with language barriers adding to the reluctance to engage in more informal interaction.

Overall, the strong binding nature of outcomes clearly led to a lack of willingness to create a learning and discussion-promoting environment, and ultimately blocked SL, although at the same time, this strong binding nature could have supported multi-party interaction among all "interested parties" (Art.14 WFD), with a strong probability that the decision-making institutions would have adopted the outcomes.

In contrast, in the French case study, one of the central tasks of the EPIDOR was to support and facilitate discussion between different stakeholders. Establishment of the process at the river basin level meant there was a huge number of stakeholders and interests. Therefore, it was organized such that multi-party interaction took place only in a very formalized manner. Raising awareness by establishing information flow to all stakeholders can be seen one of its elements of success. However, in terms of making room for discussion and generating understanding among all participants, including the competent water authorities, SL was strongly limited by this. Looking at the nature and implementation of the outcome, it also became clear that a lack of SL occurred to further strengthen the implementation of joint actions.

A similar weakness can be found in the other French process. Also starting with spatially complementary and independent institutions in the process of water level management, here some of the actors—especially the fishermen and the power generating company—were strongly and openly competing for use of the river. With the help of EPIDOR, the established process initially seemed very promising in terms of SL. It was very well received in terms of information flow and diversity of interaction. However, spatial misfit with the decision-making institutions eventually halted the process: the low implementation of outcomes decreased the value of the process for stakeholders. Finally, it became apparent that the legal responsibility for one aspect of the proposed solution (i.e., financial compensation) was at the non-participating national level, whereas the participatory process was at the local level.

Table 2. Results of French and German case studies. Support for SL is indicated as none (0), little (+), or strong (++). SH: Stakeholders; WG WFD = Working Group for the implementation of the WFD in the International Elbe river basin district; WA = water authority.

Aspect of SL	Spatial misfit in the studied processes			
	International level of Elbe river basin (WG WFD) (150 000 km ²)	Regional level of Elbe river basin: Thuringia process (4500 km ²)	Dordogne Valley Summit Process (25 000 km ²)	Dordogne water level management process (main stream of 450 km length)
	Spatially complementary and strong, relatively independent institutions and actors	Spatially well-adjusted institutions with competing SH with overlapping territories in hierarchical nested systems	Spatially complementary and strong, relatively independent institutions with competing SH with overlapping territories in hierarchical nested systems	Spatially complementary and strong, relatively independent institutions with competing SH with overlapping territories in hierarchical nested systems
1) Governance Context of SL (indicator: availability of multi-party interaction among all actors)	SL: 0 Available only between authorities; interaction with other SH only bilateral, at the national level.	SL: ++ Multi-party interaction was formally established and practiced at two levels.	SL: + Only at the summit meeting for all SH. Most of the process, interaction between EPIDOR and a single or few SH at the same time.	SL: + Interaction was available over longer periods, but did not include all important actors.
2) Outcome (indicator: nature and implementation of outcome)	SL: 0 Although “only” recommendations, formal adoption/ implementation high. Probably led to constraints in openness of WA to involve SH, but nature not clearly communicated to SH.	SL: ++ Recommendations with strong pressure to be adopted from the SH and commitment from WA to follow first priorities if within legal framework of WFD.	SL: 0 Recommendatory with low implementation	SL: 0 Strong binding nature expected, but lack of implementation disappointed SH.
3) Social involvement—boundary management (indicator: process boundary)	SL: 0 International level as a means to facilitate intra-national discussion. International boundary less relevant. SH were not sure of process importance.	SL: (++) Process boundary had the potential to be rather strong, but some SH doubted whether it would succeed there.	SL: ++ The boundary of the process was initially defined from the temporal aspect to raise awareness of the Dordogne river basin. Strong uniqueness of the process and lack of similar alternative processes. Weakness of process: the decision-making structure was not directly involved in the Charter process.	SL: from ++ to 0 The process boundary was initially very strong. Thus, the process faltered with the increasing awareness of the role of the (non-participating) nationally responsible authority. The process boundary had to be expanded to include actors at the national level, which was only achieved by excluding other participants from the process.

(con'd)

4) Content management (indicator: information flow)	SL: 0	SL: +	SL: ++	SL: +
	Information flow mainly between WA. SH felt they had not been sufficiently informed.	Information flow mainly from WA to SH, but SH acknowledged the need to be informed, and appreciated it.	Information flow ensured an equal knowledge base for all actors.	Strong, also included external expertise. Information flow concerning the nature and limitations of negotiation outcomes was perhaps insufficient
5) Social involvement—ground rules (indicator: diversity of interaction)	SL: 0/+	SL: +	SL: 0	SL: ++
	Very low diversity in formalized meetings. Informal interaction and discussion between different actors were also established.	So far very low: mainly presentations and questions. Establishment of pilot projects to improve diversity and different forms of collaboration.	Limited to exchange of different SH groups with EPIDOR and a strongly formalized one-time interaction between all SH groups.	Diversity of interaction was identified as positive for SL, in particular for improving relations between the hydropower company and the local fishermen.
SUMMARY CONCERNING SL	No SL indicated at time of case study (2003–2004)	Indicators showed SL was enabled and could be improved (see diversity of interaction and information flow). If scepticism of SH can be turned into trust in the process, it will be a major success of and for SL.	The ambivalence of indicators of SL point toward limitations of SL in the process. Although the learning of different actors facilitated and mediated by EPIDOR was probably achieved, the lack of implementation indicates a lack of commitment of all SH—something that SL claims to achieve through direct multi-party interaction.	SL occurred during the process, but the impact was low due to the weak nature of outcome. The process was finally halted because of this.
IMPACT OF SPATIAL MISFIT	Independence of different actors, who did not ask for SL. The ICPE, as coordinating body, supported exchange through logistical and administrative support to WA. No successful activity to engage different SH in activities at the international level.	The close spatial fit between the participatory and decision-making institutions was deliberately set up so that SH knew who to contact in case of a complaint.	The spatial independence of SH was reduced by the activities of EPIDOR. The misfit between the river basin and the spatial areas covered by the different WA, allowed the WA to limit their engagement as they were not directly concerned.	Spatial misfit between decision-making institutions and participatory institutions (i.e., the legal responsibility lies with the national level, whereas the problem was identified at the local level) hindered further SL because SH chose not to interact any longer if their responsibilities were insufficient.

In Thuringia, the participatory institutions were deliberately well-adjusted to the decision-making structure. With the same representative from the Ministry of Environment chairing both processes and considering the needs of successful participatory processes, the process gained remarkably positive feedback from participants. In future, if the scepticism of stakeholders can be transformed into trust in the process, this could be strongly successful in terms of SL.

Contrary to the misfit within institutional settings, the misfit between the SRS of the different stakeholders generally seemed to have less impact on SL. This was especially true if there was either a strong boundary around the participatory process, such as in Thuringia, or if the different spatial areas were able to act independently of one another, such as at the international level for the Elbe river basin. However, if the different SRS of actors also correlated with different responsibilities for decision making, such as was the case in the French processes, the different SRS of the actors might also contribute to the perforation of the process boundary. Looking at the results from Thuringia and the French water level negotiation process, the result could also imply that this is especially true if there are different, better fitting institutions available that offer stakeholders an alternative to the participatory process, thus perforating the process boundary.

CONCLUSIONS

In the multi-scale, multi-level settings of river basin governance, it is difficult to fully exclude spatial misfit, which will most certainly always exist between different actors. Until now, water managers—in most cases rightly so—felt that RBMP was generally successful in terms of reaching agreements. Still, as Mostert et al. (2007) point out: “(t)he social learning process can begin when the stakeholders realize their interdependence and think that participation in the process can yield better results than unilateral action.”

In the context of the WFD, water managers who have reached this point and want to establish new institutions for PP in an existing governance context have to pay special attention to interaction with the already established decision-making process: how are the results integrated into the existing decision-making structure?

Summarizing the results from our analysis, the interface linking different participatory and decision-making institutions had different characteristics addressing spatial misfit. Not only the positive results in Thuringia but also the deficits in the other processes show that an interface that successfully facilitates SL processes requires financial and legal capacities, including the mandate to deal with certain tasks. The interface not only needs to have the mandate for communicating with stakeholders, establishing multi-party interaction, and facilitating information flow (such as EPIDOR). It also needs a close link to the decision-making institutions to ensure that the gains and incentives are sufficient for stakeholders to engage in them (such as the Thuringia Ministry of Environment). Priorities or criteria for decisions and recommendations (especially if they change) have to be communicated between both institutions. A strong interface can either be materialized in a strong coordinating body or a rule/norm or other institution that specifically ensures that the results from the participatory processes are incorporated by decision-making institutions. The results in Thuringia may indicate that it is especially positive if one authority feels responsible as the interface and also actively participates in both institutions.

Even though a strong interface between participatory and decision-making institutions will strongly support SL in participatory processes, it may not be able to solve all challenges, such as language barriers to informal interactions. It might add, however, to the relevance attributed to the process by participants. If multi-party interaction and the nature and implementation of outcomes are strongly supportive of SL, participants may be motivated to engage more actively in the process and to help support a learning-friendly environment.

This need for interface exists at the international level as well as at lower levels. However, the lower number of scales involved at the regional or local management levels could decrease the role of spatial misfit in institutional settings due to the higher level of interdependency and one actor with clearly designated authority (i.e., one actor with most decision-making responsibilities).

Going beyond the analysis of this paper, interactions between scales or between institutions are not always only supported by formal interlinkages. Often, linkages between institutions profit from individuals who work in both of them (cf. Wenger

(1998) on brokerage). This has been confirmed by the strong support for SL in Thuringia, where the person who initiated the participatory process is part of and personally strongly interested in its success. This stresses another aspect of the complexity of SL in water resource management: especially at larger scales in terms of areas covered (regional, national, basin-scale), stakes are generally represented by stakeholder groups, which in turn are represented by one or a few delegates. These representatives are people driven by their individual interest and experience, which may sometimes complement or work against the objectives of the overall process. For example, the establishment of a new participatory process can give newcomers an open field to consolidate their positions. On the other hand, the participatory process may be established at the same time as other reorganizational attempts in an administrative body, putting additional pressure on those trying to retain their jobs and influence. To optimize SL between different stakeholder groups, future research needs to look in more depth into the implications of these dimensions determined by the individual interests of representatives and their role in bridging scales and sectors.

Responses to this article can be read online at:
<http://www.ecologyandsociety.org/vol13/iss1/art7/responses/>

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LITERATURE CITED

- Barraqué, B., J.-P. Le Bourhis, P. Maurel, and R. Raymond. 2004. Public participation in the Dordogne River Basin. Case study report under Work Package 5. HarmoniCOP, Swindon, UK. (online) URL: <http://www.harmonicop.info>.
- Borowski, I., N. Kranz, E. Kampa, and A. Vorwerk. 2004. *Public Participation in the Elbe Basin. Case study report produced under Work Package 5*. I. Borowski. Osnabrück, University of Osnabrueck, Germany. HarmoniCOP. (online) URL: <http://www.harmonicop.info>.
- Craps, M., editor. 2003. *Social learning in river basin management*. HarmoniCOP WP2 Reference Document - Deliverable 3a. HarmoniCOP, Leuven.
- Craps, M., and P. Maurel. 2003. *Social learning pool of questions. An instrument to diagnose social learning and IC-tools in European river basin management*. HarmoniCOP, K.U.Leuven – Centre for Organizational and Personnel Psychology, Leuven, The Netherlands.
- Cumming, G. S., D. H. M. Cumming, and C. L. Redman. 2006. Scale mismatches in social-ecological systems: causes, consequences, and solutions. *Ecology and Society* 11(1): 14. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art14/>.
- Dietz, T., E. Ostrom, and P. C. Stern. 2003. The struggle to govern the commons. *Science* 302:1907–1912.
- European Commission. 2000. European Water Framework Directive 2000/60/EC. *Official Journal of the European Communities* L 327:1–72. (online) URL: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF>.
- . 2002. *Guidance on public participation in relation to the water framework directive. Active involvement, consultation, and public access to information*. European Commission, Brussels, EU. (online) URL: http://www.eau2015-rhin-meuse.fr/fr/ressources/documents/guide_participation-public.pdf.
- Folke, C., T. Hahn, P. Olsson, and J. Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30:8.1–8.33.
- Folke, C., L. Pritchard, Jr., F. Berkes, J. Colding, and U. Svedin. 2007. The problem of fit between ecosystems and institutions: ten years later. *Ecology and Society* 12(1): 30. <http://www.ecologyandsociety.org/vol12/iss1/art30/>.
- Gibson, C. C., E. Ostrom, and T. K. Ahn. 2000. The concept of scale and the human dimensions of

global change: a survey. *Ecological Economics* 32:217–239.

HarmoniCOP. 2005. *Learning together to manage together. Improving participation in water management.* Osnabrück, Germany. (online) URL: www.harmonicop.uos.de. (Available in nine different languages.)

Lebel, L., P. Garden, and M. Imamura. 2005. The politics of scale, position, and place in the governance of water resources in the Mekong Region. *Ecology and Society* 10(2): <http://www.ecologyandsociety.org/vol10/iss2/art18/>.

Moss, T. 2003. Solving problems of “fit” at the expense of problems of “interplay”? The spatial reorganisation of water management following the EU Water Framework Directive. How institutions change. Pages 85–121 in H. Breit, A. Engels, T. Moss and M. Troja, editors. *Perspectives on Social Learning in Global and Local Environmental Contexts.* Leske and Budrich, Opladen Germany.

Mostert, E., C. Pahl-Wostl, Y. Rees, B. Searle, D. Tabara, and J. Tippet. 2007. Social learning in European river-basin management: barriers and fostering mechanisms from 10 river basins. *Ecology and Society* 12(1): 19. (online) URL: <http://www.ecologyandsociety.org/vol12/iss1/art19/>.

Pahl-Wostl, C. 2006. The importance of social learning in restoring the multifunctionality of rivers and floodplains. *Ecology and Society* 11(1): 10. (online) URL: <http://www.ecologyandsociety.org/vol11/iss1/art10/>.

Pahl-Wostl, C., M. Craps, E. Mostert, T. Taillieu, D. Tabara, and A. Dewulf. 2007. Social learning and water resources management. *Ecology and Society* 12(2): 5. (online) URL: <http://www.ecologyandsociety.org/vol12/iss2/art5>.

Searle, B., J. Tippet, Å. Johannessen, and Y. Rees. 2005. Good European practices for stakeholder involvement—lessons from real planning processes. Case studies and experiments. WorkPackage 5, report of the HarmoniCOP project - Harmonising Collaborative Planning. Swindon, UK. (online) URL: <http://www.harmonicop.uos.de/download.php>.

Snyder, W. M., E. Wenger, and X. de Sousa Briggs. 2003. Communities of practice in

government: leveraging knowledge for performance. *The Public Manager* 32(4):17–22.

Tabara, D. 2005. *Sustainability learning for river basin management and planning in Europe.* HarmoniCOP, Barcelona, Spain.

Wenger, E. 1998. *Communities of Practice. Learning, meaning, and identity.* Cambridge University Press, Cambridge, UK.

Woodhill, A. J. 2002. Dialogue and transboundary water resources management: towards a framework for facilitating social learning. Pages 49–64 in J. Timmerman and S. Langaas, editors. *The role and use of environmental information in European transboundary river basin management.* WA Publishing, London, UK.

Young, O. R. 2002. *The institutional dimensions of environmental change: fit, interplay, and scale.* MIT Press, Cambridge, Massachusetts, USA.

Appendix 1. Data Collection of German Case Study

[Please click here to download file 'appendix1.pdf'.](#)

Appendix 2. Data Collection for the French Case Study

[Please click here to download file 'appendix2.pdf'.](#)

Appendix 3. Institutional Settings of the Elbe river basin as studied in the HarmoniCOP Case Study

[Please click here to download file 'appendix3.pdf'.](#)

Appendix 4. Institutional Settings in the Dordogne River Basin

[Please click here to download file 'appendix4.pdf'.](#)
